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Critically Appraised Topic: Hippotherapy Intervention for School Age Children with Autism Spectrum Disorders

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Focus Question

To what degree does hippotherapy decrease sensory modulation issues in children ages 5-16 with a diagnosis of autism spectrum disorder in comparison to the level of sensory issues in children without hippotherapy intervention?

Clinical Scenario

The prevalence of autism spectrum disorders (ASD) has risen nearly 600 percent in the past two decades, with estimates suggesting that 1 in 68 children worldwide have a clinical diagnosis (Centers for Disease Control and Prevention [CDC], 2014). Children with ASD experience resultant challenges in occupational functioning due to impairments in communication, social interaction, and sensory processing. Sensory modulation issues can cause negative impacts on physical and social functioning. Modulation allows filtering of irrelevant stimuli and maintenance of an optimal level of arousal that facilitates attention to environmental demands with longer engagement in tasks (Llambias, Magill-Evans, Smith, & Warren, 2016). Recent literature suggests that occupational therapy has the potential to positively impact children with sensory modulation issues caused by autism spectrum disorder through the use of hippotherapy.

Koca and Ataseven (2015) defined hippotherapy as a form of occupational therapy in which a therapist uses the characteristic movements of a horse to provide carefully graded motor and sensory input to improve neurological function and sensory processing. Anderson and Meints (2016) showed that hippotherapy falls under the broader therapeutic approach of Equine-Assisted Activities and Therapies, specifically the sub-category of equine-assisted therapies (EAT). Hippotherapy provides sensory integration benefits for the child riding the horse as the

horse's movements such as gait (walk, trot), speed (fast, slow), and pattern (figures) increase sensory input. For example, trotting could be used for vestibular and proprioceptive stimulation in the child (Llambias et al., 2016). Repeated stimulation of these systems allows children to more appropriately modulate incoming sensory information.

Occupational therapy practitioners traditionally help children experiencing sensory modulation issues with ASD through modification of activities in their environment, remediating skills, and promoting healthy habits, roles, and routines. Hippotherapy is a promising form of therapy that has been shown by occupational therapists and other healthcare fields to decrease sensory modulation issues in children with an autism spectrum disorder. In order to continue helping children with ASD, occupational therapists need to be more aware and knowledgeable of emerging practices and the current evidence base.

Purpose Statement

The purpose of this critically appraised topic is to demonstrate that hippotherapy is an effective intervention in treatment for children ages 5-16 experiencing sensory modulation issues due to autism spectrum disorder. Clinicians should consider incorporating hippotherapy in treatment to decrease sensory modulation issues.

Synthesized Summary of Key Findings

Inclusion and Exclusion Criteria for Articles

The inclusion criteria of this critically appraised topic include school-aged children from 5-16 years old who experience sensory modulation issues due to being diagnosed with an autism spectrum disorder. The exclusion criteria include individuals who experience motor impairments or who are not classified on the autism spectrum.

Key Findings

A total of fourteen articles were closely reviewed based on the inclusion criteria. Three articles met the inclusion criteria and provided evidence to support hippotherapy as a sensory modulation intervention for children with autism spectrum disorder. Articles reviewed included one Level I randomized control trial (Gabriels et al., 2015), one Level III single group quasi-experimental interrupted time series (Ward, Whalon, Rusnak, Wendell, & Paschall, 2013), and one Level III multiple baseline design (Llambias et al., 2016). These three studies provided moderate strength of evidence with a moderate risk of bias. All three articles also reported significant findings that support the effectiveness of hippotherapy as an intervention to decrease sensory modulation issues in children with a diagnosis of autism spectrum disorder.

Study Designs

Gabriels et al. (2015) used a randomized control trial with 116 participants who had previously been diagnosed with ASD. The experimental group participated in therapeutic riding and the control group participated in a barn activity where no real horses were present, only a life-sized stuffed horse. Both groups used a ten-week intervention with sessions lasting at least 45 minutes. Gabriels et al. (2015) used two tools to measure outcomes of sensory modulation, the Aberrant Behavior Checklist-Community (ABC-C) and the Social Responsiveness Scale (SRS). Gabriels et al. (2015) stated "the SRS is a 65-item questionnaire that measures the social impairments in ASD on five subscales (social awareness, social cognition, social motivation, social communication and autistic mannerisms). The SRS has high internal consistency and retest temporal stability in males and females" (p. 544). Results showed significant improvementin the ABC-C subscales of irritability and hyperactivity, which can be linked

tsensory modulation issues. The SRS results also showed a significant improvement in communication.

Llambias et al. (2016) used a sample size of seven participants in a multiple baseline design who had previously been diagnosed with ASD. The children in the study participated in nine to eleven baseline sessions, which involved different activities in a playroom, and nine to twelve intervention sessions with horse riding. All sessions were 45-60 minutes long. Authors found that the vestibular and proprioceptive input of riding the horses led to an increase in engagement and communication with the therapist completing the intervention session. In follow up, the participants demonstrated higher levels of engagement and communication than they did in baseline sessions. In regard to results being related to sensory modulation, the authors stated, "another explanation is that the activities may have addressed the children's sensory needs. Optimal arousal allows the child to produce appropriate responses to environmental demands and therefore more successfully engage" (Llambias et al., 2016, p. 6).

Ward et al. (2013) used a sample size of twenty-one participants in a quasi-experimental time series study that examined association between therapeutic riding and social communication and sensory processing skills of children with ASD. The study consisted of six weeks of therapeutic riding, a six-week break, four weeks of therapeutic riding, a six-week break, and eight weeks of therapeutic riding. Sessions lasted roughly 45 minutes. Authors used the Gilliam Autism Rating Scale: Second Edition (GARS-2) as a measure in the study, which measures perceived severity of ASD. The outcomes showed a significant shift in participants' GARS-2 scores from "Very Likely Autistic" to "Possible Autistic" at the conclusion of the study. One theory presented by the authors for these results is that therapeutic riding stimulates the

cerebellum, which "has been linked to motor, sensory, and social behavior" (Ward et al., 2013, p. 2197).

All intervention sessions within each study occurred at an equine center and were led by a certified Professional Association of Therapeutic Horsemanship (PATH) International therapeutic riding instructor (Gabriels et al., 2015; Llambias et al., 2016; Ward et al., 2013). Having a PATH International certification means the center adheres to the highest safety and ethical standards in the industry.

Sensory Modulation

Llambias et al. (2016) suggested that the use of animals in therapeutic sessions can be a strong motivator for children with ASD by improving self-regulation. Activities addressed the children's sensory needs by stimulating the vestibular and proprioceptive systems by altering the horse's gait. Optimal arousal allowed the child to produce appropriate responses to environmental demands and therefore more successfully engage (Llambias et al., 2016). In the same manner, results from the study by Gabriels et al. (2015) showed significant improvement in participants' level of irritability and hyperactivity, which are both examples of sensory modulation issues. Similarly, Ward et al. (2013) theorized that the stimulation of the cerebellum from therapeutic riding helped to improve sensory functioning.

Social Functioning

Ward et al. (2013) found that participants improved their attention in a classroom setting after they had taken part in the therapeutic riding intervention. Likewise, Gabriels et al. (2015) stated "to engage in therapeutic riding activities involves a nonverbal joint-attention or shared attention experience that may serve a platform for improving behaviors and social-

communication skills in children with ASD" (p. 547). In the study by Llambias et al. (2016), when a child had decreased attention, a few minutes of trotting were implemented, which resulted in the child being more focused. These changes in engagement and attention were maintained during follow-up in the presence of a familiar adult (Llambias et al., 2016).

Communication

Gabriels et al. (2015) found there was a significant increase in the amount of words spoken and different words used in the therapeutic group, which is a concept also supported by Llambias et al. (2016). Mothers reported that their children were talking more, with more initiation of communication, new words, or longer sentences after receiving the hippotherapy interventions (Llambias et al., 2016). Similarly, Ward et al. (2013) found that after ten weeks of therapeutic riding, the participants in the study showed improved social communication in the classroom.

Strengths and Limitations

Strengths of the study by Gabriels et al. (2015) included the large sample size of 116 children and the design being a randomized control trial. A weakness of the studies by Llambias et al. (2016) and Ward et al. (2013) were the small sample sizes of seven and twenty-one. A limitation noted by Llambias et al. (2016) was that children included in the study must be able to understand English. A strength of all three studies was the use of PATH certified therapists and facilities. The Llambias et al. (2016) study reported that the intervention's social validity was supported by excellent attendance and identified this as a strength of the study. The results of these studies show that hippotherapy is both a reliable and valid intervention to be used for sensory modulation issues in children with ASD.

Clinical Practice Applicability

Hippotherapy is a form of occupational therapy in which a therapist uses the characteristic movements of a horse to provide carefully graded motor and sensory input to improve neurological function and sensory processing. There currently is not a significant amount of published research available that supports hippotherapy as a form of occupational therapy intervention specifically for children with ASD. However, the literature reviewed shows that hippotherapy does show effectiveness in decreasing sensory modulation issues in children ages 5-16 with a diagnosis of autism spectrum disorder. There is moderate evidence supported throughout other therapy disciplines that suggests hippotherapy is a viable form of therapy for sensory modulation in children with ASD. Occupational therapy practitioners traditionally help children with ASD through modification of activities in their environment, remediating skills, and promoting healthy habits, roles, and routines. Hippotherapy is a promising tool that can be added by occupational therapists to their treatment regimen to provide better outcomes for their patients and break up the monotony of standard treatment. In order to add hippotherapy as an occupational therapy intervention for sensory modulation for this population, therapists will need to seek out facilities outfitted for hippotherapy which employ PATH certified therapists. Hippotherapy sessions can involve multiple people along with the primary therapist, including the PATH therapists and assistants to monitor the children while riding. A potential bias that exists with these studies indicates that this intervention is more likely to be offered to native-English speaking children, and mostly in rural areas, as more urban areas may not have access to facilities that offer this service. Further, none of the articles indicated there was an effort to select populations that were fully representative of children with ASD. Overall, further research is

needed to establish hippotherapy as an effective sensory modulation treatment to be used by occupational therapists for children with ASD.

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